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Are we speaking the same language? Towards a definition and categorization framework for environmental plastic debris

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1. Background

The occurrence and accumulation of plastic debris is a global environmental issue, with potential consequences affecting the economy, wildlife and human health. This provides the basis for initiatives to change the management and regulation on the design, use and disposal of plastic in order to reduce emissions to the environment. However, there is currently a lack of consensus on the definition and categorisation of environmental plastic debris, including macro-, micro- and nanoplastics. The reason for this is that 'plastic debris' is a rather unspecific umbrella term covering multiple synthetic polymers with diverse physico-chemical properties.

The lack of clarity in terminology regarding plastic debris, in particular microplastics, results in confusion and misunderstandings. This is problematic both for legislative measures as well as for general coherence and data comparability between studies. While finding a common language appears beneficial, any definition should be well-considered and well-justified as it will ultimately shape the direction of future research and mitigation measures.

To help decide whether a consensus definition and categorization framework for plastic debris is valuable and if so how this might look, a critical discussion is needed within the scientific community. We would like to foster such debate by providing impulses and sharing our thoughts on whether and how to define and categorize environmental plastics.

2. Content

In our presentation, which will have an interactive format, we will explore the following issues:

- 1) What is the rationale for working towards a consensus on definitions of environmental plastics debris?
- 2) What are potential advantages and disadvantages?
- 3) Based on this, do we need such a definition, especially for microplastics?
- 4) If so, which criteria (i.e., physico-chemical properties) need to be considered for a definition?
- 5) Which criteria need to be considered to further categorization (e.g., size, shape, color)?
- 6) What are areas of uncertainty and special cases that we need to consider?
- 7) How can we integrate these criteria in a framework?
- 8) How can we promote a framework that is decisive yet adaptive to benefit research and regulation?
- 9) Finally, how do we best go forward to arrive at a consensus in the scientific community?

3. Format

The aim of our presentation is to foster an open and critical discussion in the SETAC community on whether we need a consensus definition for environmental plastics rather than presenting definitive answers. Therefore, we will use a new format with two presenters jointly discussing the advantages and

disadvantages of a definition. Further we will discuss our ideas on relevant components of a definition/categorization framework. The format will be similar to a disputation and we will take opposing views on each question.

To get immediate feedback by the community, we will use online polling asking specific questions to the audience throughout the presentation. This will cover opinions on the need of a definition, acceptance of certain defining and categorizing criteria and questions on special cases with high uncertainty. The aim of this is to get an *ad hoc* idea on where consensus may be easy to achieve and areas which are controversial.

Finally, we will present an online platform (www.microplastics.eu, currently under development) that we will use to perform a large-scale survey on a consensus definition of environmental plastic debris. In addition, the platform will host a module for discussing the questions mentioned above and a module for networking. This platform can be used by the audience and the wider community to further discuss the impulses we give and share their opinions and input.

4. Outcomes

Our presentation will kick-off the discussion within the environmental sciences community on whether and how we define and classify plastics as one of our most popular research object. Our presentation will create awareness on the lack of a common terminology and the potential implications. By that, we hope to engage the larger community in a process of discussing and ultimately arriving at a common language, may it be in the form of a consensus definition or something different.

We will collect and synthesize the *ad hoc* feedback from the presentation to produce a snap shot statement on the areas of consensus and controversy. Further, we will use the feedback to refine our online survey and – depending on the quality – adapt our definition framework. For the future, we will use the SETAC Rome inputs as a base from which we can move forward, e.g. in special focus meetings or workshops.